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Low-level Jets over Southeast China: Rainy Season Climatology During Summer 2003

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Although considerable research has been conducted to study the characteristics of the rainstorm related low-level jets (LLJs) over southeast China, little is known about their climatology status. In this study, the rainy season climatology of LLJs ($\geq$12 m s-1, below 600 hPa) over this region during summer 2003 is examined. This is chosen as a typical case because the heavy Meiyu-frontal rainfall events between 20 June and 11 July causes severe flood in the Yangtze-Huai River Basin. The analysis uses the six-hourly global analysis data provided by the 1.0$\times$1.0-degree grids of the National Centers for Environmental Prediction (NCEP) Final (FNL) operational model. It is found that the southwesterly LLJ is a frequently appearing phenomenon with pronounced diurnal variation over southeast China. The LLJs concentrate over the mountainous region between 26-28 °N, with an average width of about 400 – 600 km, and most of the core wind speed appears on levels 850 and 800 hPa (1000 -1800 m). The maximum wind speed height of LLJs in the Yangtze-River Basin (near 30 °N) has an upper shift with the influence of mid-latitude westerly winds. The LLJ strength is regulated by the background monsoonal flow, ranging from 12 to 24 m s-1. About 80% of the observed LLJ events occur between 0000 and 0800 UTC (nighttime to morning hours). Because of the inverse thermal gradient over sloping terrain from day to night, the diurnal variation amplitude is large in the levels below 800 hPa. The nocturnal southwesterly LLJs strengthen the water vapor transportation and air mass convergence along the Yangtze-Huai River Basin. As a result, the rainfall shows consistent morning peaks during the Meiyu period.